

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
24 July 2003 (24.07.2003)

PCT

(10) International Publication Number  
**WO 03/061042 A3**

(51) International Patent Classification<sup>7</sup>: **H01M 8/02,**  
4/86, C25B 11/03, B32B 15/14, B22F 7/00

(21) International Application Number: PCT/EP02/14531

(22) International Filing Date:  
19 December 2002 (19.12.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
02075156.6 15 January 2002 (15.01.2002) EP

(71) Applicant (for all designated States except US): N.V.  
**BEKAERT S.A.** [BE/BE]; Bekaertstraat 2, B-8550 ZW-  
EVEGEM (BE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LOSFELD, Ronny**  
[BE/BE]; Kuiperstraat 47, B-8790 WAREGEM (BE).  
**ANAF, Lieven** [BE/BE]; Westerlaan 25 - A2, B-8790  
WAREGEM (BE).

(74) Agent: **VAN STEENLANDT, Wim**; N.V. BEKAERT  
S.A., D.I.E., Bekaertstraat 2, B-8550 Zwevegem (BE).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN,  
YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK,  
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

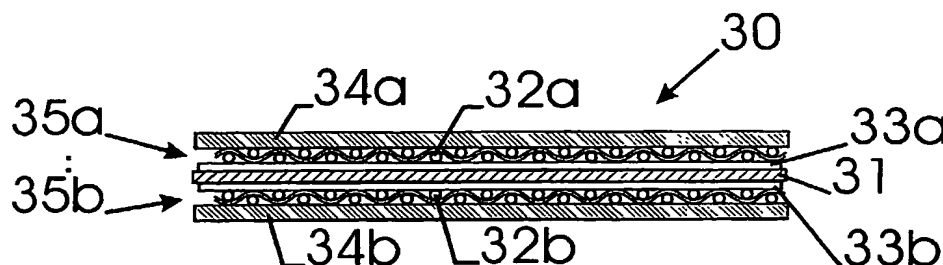
Published:

— with international search report

(88) Date of publication of the international search report:  
23 October 2003

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: METAL STACK FOR FUEL CELLS OR ELECTROLYSERS



(57) Abstract: A stack, to be used in a fuel cell or electrolyser, comprises a collector layer (31), at least one diffusion layer (32a, 32b) and at least one anchoring layer (33a, 33b). The collector layer being a metal foil or metal plate or foamed metal sheet, the diffusion layer being a metal mesh or expanded metal sheet. An anchoring layer having a thickness of less than 0.5mm and comprising metal fibers, is sintered between the collector layer and the diffusion layer.



WO 03/061042 A3

# INTERNATIONAL SEARCH REPORT

Internal	Application No
PCT/EP	02/14531

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 H01M8/02 H01M4/86 C25B11/03 B32B15/14 B22F7/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 H01M C25B B32B B22F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, PAJ		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 69003 A (LYNNTECH INC) 16 November 2000 (2000-11-16) cited in the application claims 1,3-5,7,9,12-16 page 13, paragraph 2 -page 14, paragraph 3; figures 13,15 figure 13	1,2,5,8, 10,15, 20,22
A	-& US 6 232 010 B1 (ALAN J CISAR ET AL) 15 May 2001 (2001-05-15)  claims 4,5,7-12,15,16,21-23 column 8, line 62 -column 9, line 49; figures 13,15	1,2,5,8, 10,15, 20,22
A	EP 0 432 381 A (ASEA BROWN BOVERI) 19 June 1991 (1991-06-19) claim 2; figure 1 column 3, line 50 -column 4, line 12	1,16,20
-/--		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <span style="margin-left: 100px;"><input checked="" type="checkbox"/> Patent family members are listed in annex.</span>		
* Special categories of cited documents : <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*Z* document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search <div style="text-align: center; font-weight: bold;">25 July 2003</div>	Date of mailing of the international search report <div style="text-align: center; font-weight: bold;">31/07/2003</div>	
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Authorized officer <div style="text-align: center; font-weight: bold;">D'hondt, J</div>	

## INTERNATIONAL SEARCH REPORT

Internat. Application No  
PCT/EP 02/14531

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 096 450 A (WALSH MICHAEL M) 1 August 2000 (2000-08-01) claims 1,2; figure 1 column 6, line 63 - column 7, line 28 -----	1, 15, 19, 20
A	US 5 076 875 A (PADDEN JAMES B) 31 December 1991 (1991-12-31) column 3, line 3 - line 41; figure 4 -----	1
A	EP 0 392 082 A (KATAYAMA TOKUSHU KOGYO KK) 17 October 1990 (1990-10-17) figures 18A, 19 column 21, line 8 - line 27 -----	1, 2
A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 214 (C-362), 25 July 1986 (1986-07-25) - & JP 61 052383 A (JAPAN STORAGE BATTERY CO LTD), 15 March 1986 (1986-03-15) abstract -----	1, 17, 19
A	WO 98 33221 A (LYNNTECH INC) 30 July 1998 (1998-07-30) page 6, line 10 - line 17; claims 1, 3; figures 3A, 3B -----	1

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/EP 02/14531

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0069003	A	16-11-2000	US 6232010 B1	15-05-2001
			AU 4816500 A	21-11-2000
			EP 1214749 A2	19-06-2002
			TW 475293 B	01-02-2002
			WO 0069003 A2	16-11-2000
			US 2003124411 A1	03-07-2003
			US 6562507 B1	13-05-2003
EP 0432381	A	19-06-1991	EP 0432381 A1	19-06-1991
			JP 3184268 A	12-08-1991
US 6096450	A	01-08-2000	NONE	
US 5076875	A	31-12-1991	AU 567292 B2	19-11-1987
			AU 1547183 A	12-07-1984
			DE 3347407 A1	12-07-1984
			FR 2539209 A1	13-07-1984
			GB 2135376 A , B	30-08-1984
			JP 59183106 A	18-10-1984
			US 5302225 A	12-04-1994
			US 5145729 A	08-09-1992
EP 0392082	A	17-10-1990	JP 2274869 A	09-11-1990
			JP 3130393 A	04-06-1991
			JP 7006076 B	25-01-1995
			JP 3130394 A	04-06-1991
			JP 7006077 B	25-01-1995
			JP 2081564 C	23-08-1996
			JP 3130395 A	04-06-1991
			JP 7116635 B	13-12-1995
			DE 68925580 D1	14-03-1996
			DE 68925580 T2	19-09-1996
			EP 0392082 A2	17-10-1990
			ES 2085269 T3	01-06-1996
			US 5300165 A	05-04-1994
JP 61052383	A	15-03-1986	NONE	
WO 9833221	A	30-07-1998	US 6146780 A	14-11-2000
			AU 6648198 A	18-08-1998
			EP 0963614 A2	15-12-1999
			WO 9833221 A2	30-07-1998